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MONTANA WATER SUPPLY OUTLOOK

Snowpack and Streamflow Forecasts as of

March 1, 1984

MONTANA 51
1515 E. 6th.
HELENA, MONTANA 59620



The Montana Water Supply Outlook is a publication of the U.S. Soil Conservation Service. The SCS administers the Cooperative Snow Survey Program in cooperation with other federal, state and private agencies, organizations, and individuals.

The report is prepared by SCS, Snow Survey and Water Supply Forecast Staff, Room 443, Federal Building, 10 East Babcock, Bozeman, Montana.



Irrigation water shortages anticipated

The southwest corner of the State and two areas in central Montana will have near average to a little below average runoff. All other areas are forecast to have below to well below average water supply this spring and summer.

Irrigation shortages could vary from moderate to severe in these areas depending on water rights, stored water and temperatures and precipitation during the next few months. Weather patterns have not been favorable for picking up moisture since December. If this pattern continues through this summer, extensive water shortages can be anticipated.

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

SNOW SURVEY UNIT

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DID YOU MISS SOMETHING?

On the front page of the February 1 Water Supply Outlook for Montana, we asked for your help in identifying snow courses that you need for your operations.

If you missed the article or meant to respond but didn't, we can still incorporate your comments in the second phase of our study. Details are explained in the February 1 Outlook.



Drastic changes needed!

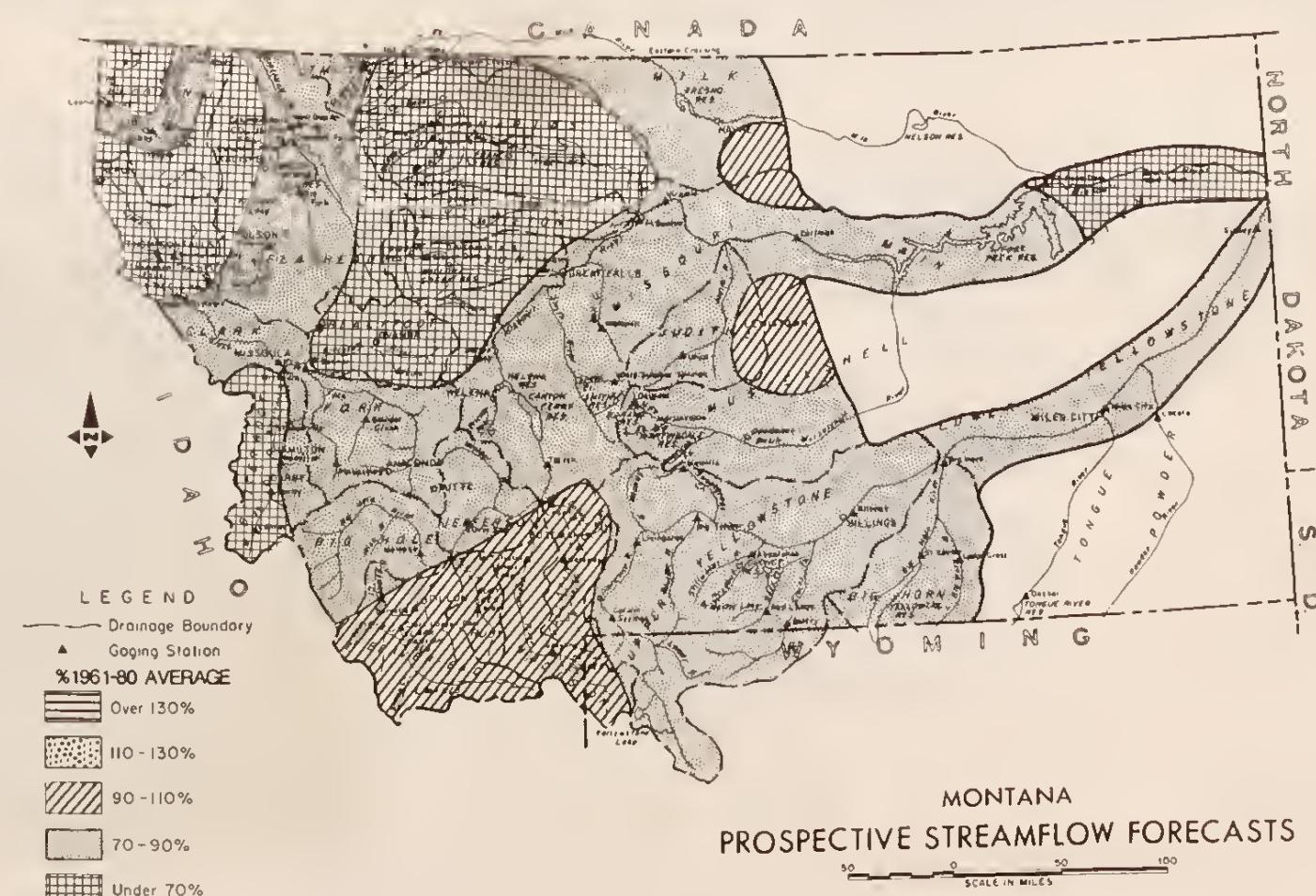
Small mountain ranges in central Montana showed some improvement in snowpack conditions but the rest of the State remained about the same or declined.

Most of the mountain headwaters have below to well below average accumulation of snow.

The area along the Continental Divide north of MacDonald Pass to Canada, has snow water content near record lows.

Over 80 percent of the snow accumulation season has passed. A drastic change in weather patterns will be required to show any major improvement in this year's snowpack. Usually the season's maximum accumulation of snow water levels occurs around mid-April.

The normally heavy snowfall areas in northwest Montana would require 200 to 300 inches of snowfall during March in order to reach average water content levels by the first of April.



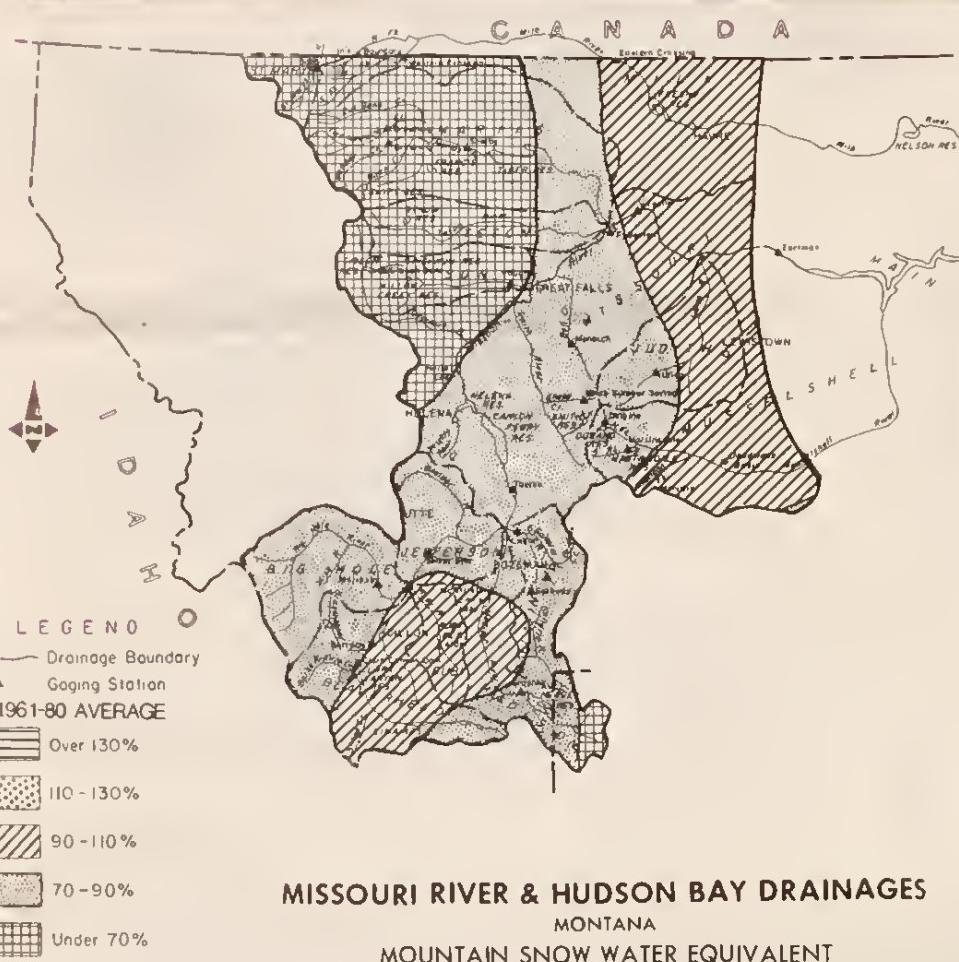
Missouri River & Hudson Bay Drainages

STREAMFLOW FORECASTS

BASIN STREAM and/or FORECAST POINT	PERIOD	THIS YEAR			PAST RECORD			THIS YEAR			PAST RECORD		
		FORECAST Thousands Acre Feet	Percent of Average	THOUSAND A. C. F.	Last Year	Average	FORECAST Thousands Acre Feet	Percent of Average	THOUSAND A. C. F.	Last Year	Average		
RED ROCK RIVER near Monida (1)	April - September	102	99	186	103	96.3	96.0	100	159	96.3			
BEAVERHEAD RIVER near Grant (2)		150	95	250	158	137	132	96	197	137			
BEAVERHEAD RIVER at Barratts (2)		195	93	209	171	180	171	95					
RUBY RIVER near Alder		105	104	101	90.0	84.6	106						
BIG HOLE RIVER near Melrose		570	75	760	520	698	74						
BOULDER RIVER near Boulder				Streamflow measurements	98.7	discontinued							
WILLOW CREEK near Harrison		18.5	92	20.0	16.7	17.8	94						
MADISON RIVER near Grayling (3)		454	92	532	496	388	357	92	408	388			
MADISON RIVER near McAllister (4)		800	94	947	848	672	632	94	749	672			
GALLATIN RIVER near Gateway		504	92	534	545	464	434	94	451	464			
INFLOW MIDDLE CREEK RESERVOIR near Bozeman (5)		26.4	92	26.3	28.6	24.7	22.8	92	22.5	24.7			
HYALITE CREEK near Bozeman (6)		40.5	90	44.8	35.4	38.7	91						
GALLATIN RIVER at Logan		547	90	611	469	523	90						
MISSOURI RIVER at Toston (7)		2137	84	2885	2,545	2,196	1841	84	2385	2,196			
SHEEP CREEK near White Sulphur Springs		17.5	80	16.8	21.8	19.0	15.0	79	13.0	19.0			
SUN RIVER at Gibson Dam (8)		295	52	349	570	522	260	50	304	522			
BELT CREEK near Monarch		102	76	134	95.0	123	77						
MISSOURI RIVER at Fort Benton (9)		2955	74	3,980	2560	3,468	74						
TWO MEDICINE CREEK near Browning (10)		158	64	248	145	235	62						
BADGER CREEK near Browning		83.0	64	130	70.0	113	62						
CUT BANK CREEK at Cut Bank		70.0	61	114	64.0	108	59						
MARIAS RIVER near Sibley		290	54	247	542	518	270	52	232	518			
MISSOURI RIVER at Virgelle (11)		3235	71	4,570	3240	4,030	71						
MISSOURI RIVER near Landusky (11)		3570	72	4,980	3150	4,383	72						
NORTH FORK MUSSELMHELL RIVER near DePine		4.6	72	6.4	3.8	5.4	70						
SOUTH FORK MUSSELMHELL RIVER above Martinsdale		44.5	71	62.8	41.3	58.9	70						
MISSOURI RIVER below Fort Peck Dam (11)		3440	69	4,961	3050	4,428	69						
MILK RIVER at Eastern Crossing*		249	91	275									
MILK RIVER at Eastern Crossing (12)*.		82.8	76	109									
INFLOW LAKE SAKAKAWEA, ND (11)		9310	73	12,755	8475	12,239	73						
SASKATCHEWAN RIVER BASIN													
SWIFTCURRENT CREEK at Sherburne (13)		98.0	77	100	128	112	85.0	76	87.9	112			
ST. MARY'S RIVER near St. Mary's (13)		370	76	487	310	416	310	75					

- (1) Adjusted for storage in Lima Reservoir.
 (2) Adjusted for storage in Lima and Clark Canyon Reservoirs.
 (3) Adjusted for storage in Hebgen Lake.
 (4) Adjusted for storage in Hebgen Lake and Ennis Lake.
 (5) Sum of West Fork Hyalite Creek and East Fork Hyalite Creek above the Reservoir.
 (6) Adjusted for storage in Middle Creek Reservoir.
 (7) Adjusted for storage in Lima, Hebgen, Ennis & Clark Canyon Reservoirs.
 (8) Adjusted for storage in Gibson Reservoir & diversions.
 (9) Adjusted for storage in Lima, Clark Canyon, Hebgen, Ennis, Gibson, Pishkun, Willow Creek & Canyon Ferry Reservoirs.
 (10) Adjusted for storage in Two Medicine Reservoir & diversions in Two Medicine Canal.
 (11) Adjusted for all upstream reservoirs.
 (12) Flow at Eastern Crossing minus St. Mary's Canal.
 (13) Adjusted for storage in Lake Sherburne.
- ALL FORECASTS PREPARED IN COOPERATION WITH THE NATIONAL WEATHER SERVICE

*March-September forecast



STREAM or AREA	WATER SUPPLY OUTLOOK	
	Flow Period	
	Spring Season	Late Season
Beaverhead	Fair	Fair
Ruby	Avg	Avg
Big Hole	Fair	Fair
Boulder	Fair	Poor
Jefferson	Fair	Fair
Madison	Fair	Fair
Gallatin	Fair	Fair
West-Side Missouri ..	Fair	Poor
Smith-Belt	Fair	Poor
Sun	Poor	Poor
Teton	Poor	Poor
Marias	Poor	Poor
Judith	Fair	Fair
Musselshell	Fair	Fair
Milk	Poor	Poor
Bear Paws	Avg	Avg
St. Mary's	Fair	Poor

Short runoff period expected

The Missouri River drainage continues to show a large variation in projected runoff. The southwest corner of Montana can expect average to a little below average streamflows. This will decrease to very low runoff from the tributaries north and west of Great Falls.

With the low snowpacks in most areas, runoff is expected to occur over a much shorter period than usual.

Irrigation supplies in the Beaverhead, Ruby, Madison and Gallatin should be near to or a little below average. However, water users in all other drainages not having stored water can expect to see moderate to severe shortages as the irrigation season progresses.

Farmers and ranchers who do not have a good water supply should consider cropping or management alternatives that would be more in tune with the projected water shortages. Local Conservation District and County Extension offices are available to provide assistance.

Updated forecasts will be issued soon after April 1 snow surveys are completed.

Below average snowpack continues

Smaller mountain ranges in the central part of the State showed a slight improvement in snowpack conditions. However, the rest of the Missouri River drainage maintained about the same snow cover percentage or dropped a little from last month.

Many of the snow measurements along the Continental Divide from MacDonald Pass north, show near record lows for water content. Storm activity increased during the last week of February but was not enough to overcome 3 weeks of dry weather.

Even if precipitation becomes average for the next 2 months, most of the area will still have below average snowpack for the season.

Normally, about 82 percent of the season's snowpack is accumulated by March 1. The maximum levels of water stored in the snow usually occur around mid-April.



Snowpacks in some mountain ranges of southwest Montana are near average.

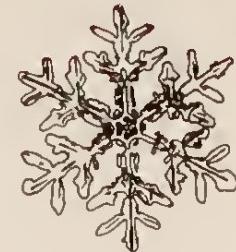
Yellowstone River Drainage

STREAMFLOW FORECASTS

BASIN STREAM and/or FORECAST POINT	THIS YEAR				PAST RECORD				THIS YEAR				PAST RECORD			
	FORECAST		THOUSAND ACRE FEET		LAST YEAR		AVERAGE		FORECAST		THOUSAND ACRE FEET		LAST YEAR		AVERAGE	
	Thousands Acre Feet	Percent of Average	Last Year	Average	Thousands Acre Feet	Percent of Average	Last Year	Average	Thousands Acre Feet	Percent of Average	Thousands Acre Feet	Percent of Average	Last Year	Average	Thousands Acre Feet	Percent of Average
PERIOD	April - September															April - July
YELLOWSTONE RIVER at Corwin Springs	1670	82	1725	2,027	1390	82	1397	1,686								
YELLOWSTONE RIVER near Livingston	1970	83		2,379	1617	82		1,969								
BOULDER RIVER at Big Timber	298	75		398	275	75		366								
STILLWATER near Absarokee (1)	494	78		632	410	78		528								
CLARKS FORK RIVER near Selfry	450	72		628	405	72		563								
ROCK CREEK near Red Lodge			Streamflow measurements	115			discontinued by USGS	88.1								
INFLOW COONEY RESERVOIR near Boyd (2)	46.0	76		60.5	37.0	75		49.5								
YELLOWSTONE RIVER at Billings	3617	81	3133	4,516	3062	80	3793	3,833								
BIGHORN RIVER near St. Xavier (3)	1466	74	2060	1,976	1325	74	1849	1,794								
LITTLE BIGHORN RIVER near Hardin	155	85		182	135	83		162								
TONGUE RIVER near Decker	235	87		269	211	86		244								
YELLOWSTONE RIVER at Miles City (4)	5286	78		6,787	4600	78		5,906								
POWDER RIVER at Moorhead	213	81		263	196	81		243								
YELLOWSTONE RIVER near Sidney (5)	5760	77		7,518	5040	77		6,544								

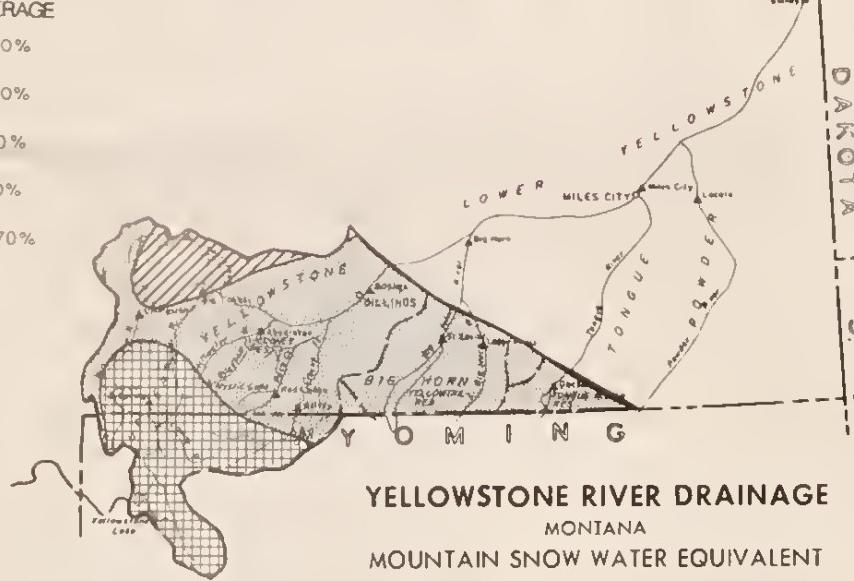
- (1) Adjusted for storage in Mystic Lake.
 (2) Adjusted for storage in Cooney Reservoir.
 (3) Adjusted for storage in Buffalo Bill, Boysen, Bull Lake, Pilot Butte and Bighorn Reservoirs.
 (4) Adjusted for storage in Bull Lake, Buffalo Bill, Boysen, Pilot Butte, Bighorn and Tongue River Reservoirs.
 (5) Adjusted for reservoirs shown in (4) and diversions into the Lower Yellowstone Canal.

ALL FORECASTS PREPARED IN COOPERATION
WITH THE NATIONAL WEATHER SERVICE



CANADA

	Drainage Boundary
	Gaging Station
	%1961-80 AVERAGE
	Over 130%
	110-130%
	90-110%
	70-90%
	Under 70%



Yellowstone snow-pack remains low

Snowpack conditions improved a little in the Crazy Mountains but remained about the same or dropped in other areas.

The headwaters of the Yellowstone River in Yellowstone National Park have well below average levels of water stored in the snowpack. Storms began moving through the area near the end of February but were not intensive enough to overcome earlier dry periods.

The outlook for March is not favorable for any significant improvement in the snowpack.

WATER SUPPLY OUTLOOK Expressed as "Poor, Fair, Average, Excellent" With Respect to Usual Supply

STREAM or AREA	Flow Period	
	Spring Season	Late Season
Yellowstone at Livingston	Fair	Poor
Shields	Fair	Fair
Boulder	Fair	Poor
Sweetgrass - Big Timber	Avg	Fair
Stillwater	Fair	Poor
Rock Creek	Fair	Poor
Clark's Fork	Fair	Poor
Yellowstone above Bighorn	Fair	Poor
8 Bighorn	Fair	Fair
Little Bighorn	Fair	Fair
Tongue	Fair	Fair
Powder	Fair	Fair
Lower Yellowstone ...	Fair	Fair

Water shortages expected

All streams in the Yellowstone drainage are forecast to have runoff in the 70 to 85 percent of average range. With the shortage of high elevation snowpack, streamflows are expected to drop off faster and sooner than usual.

This will create some moderate to severe shortages of irrigation water supplies on smaller streams during the main irrigation season. Irrigators not having stored water should be prepared to get by with less water than usual or should change their operations to adjust to this reduced supply. Assistance is available from local Conservation District and County Extension offices.

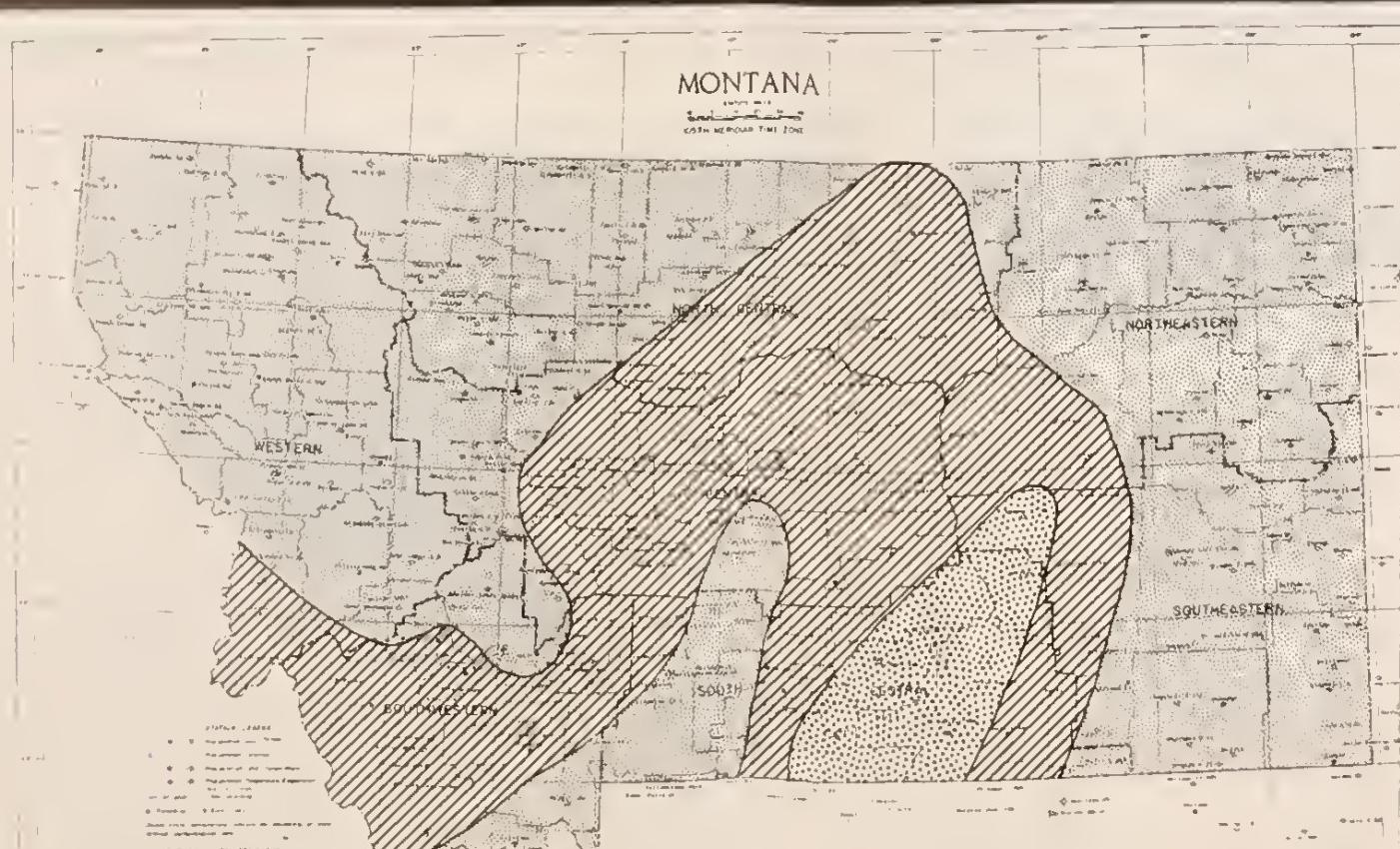
Streamflow forecasts will be updated soon after completion of the April 1 snow surveys.

SUMMARY OF SNOW MEASUREMENTS (COMPARISON WITH PREVIOUS YEARS)

RIVER BASIN and/or SUB-WATERSHED	Number of Courses Averaged	THIS YEAR'S SNOW WATER AS PERCENT OF Last Year Average	
Upper Yellowstone ab Livingston ..	21	88	69
Shields	10	102	78
Boulder & Stillwater	6	98	68
Rock Creek & Clark's Fork ..	16	85	70
Yellowstone (ab 8 Bighorn River) .	53	91	71
Bighorn/Wyoming .	29	96	77
Little Bighorn ..	3	86	78
Bighorn (Total) .	32	95	77
Tongue	9	95	80
Powder	5	89	70
Yellowstone (Total)	99	92	73

MONTANA

EAST MONTANA TIME ZONE



	Over 120%
	80-120%
	Under 80%

VALLEY PRECIPITATION

FEBRUARY 1984

Source: NWS
Great Falls, MT

SNOW SURVEY DATA

SNOW March 1, 1984

DRAINAGE BASIN and/or SNOW COURSE	NAME	THIS YEAR			PAST RECORD	
		Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (Inches)	Last Year
ABUNDANCE LAKE	8800	3/02	50	13.4	15.9	17.6
AMBROSE	6480	2/24	35	8.2	9.4	11.8
ARCH FALLS	7350	2/27	36	9.4	7.8	10.7
ASHLEY DIVIDE	4820	2/24	18	3.3	4.8	6.9
ASHLEY LAKE	4000	2/24	15	3.3	4.9	6.3
BADGER PASS	6900	2/29	58	19.7	24.3	35.3
BADGER PASS PILLOW	6900	3/01	SP	16.6	19.6	28.1
BALD EAGLE PEAK	5700	2/27	88	33.2	42.9	54.8
BALO RIDGE	7500	2/29	42	10.5	8.6	11.3
BANFIELD MOUNTAIN	5600	2/27	34	9.0	20.3	21.6
BANFIELD MOUNTAIN PILLOW	5600	2/27	SP	8.6	18.9	17.0
BARE CREEK	5500	2/28	68	24.6	38.9	42.5
BAREE MIDWAY	4600	2/28	52	14.5	30.6	33.4
BAREE TRAIL	3800	2/28	11	2.5	4.8	9.6
BARKER LAKES PILLOW	8250	3/01	SP	8.9	14.6	13.1
BASIN CREEK	7180	2/27	27	4.7	7.4	6.7
BASIN CREEK PILLOW	7180	3/01	SP	5.0	6.1	6.0
BASSOO PEAK	5150	3/01	13	3.2	7.2	9.7
BEAGLE SPRINGS	8850	3/01	32	5.8	7.0	7.2
BEAGLE SPRINGS PILLOW	8850	3/01	SP	6.5	5.9	6.5
BEAR BASIN	8150	2/28	53	16.0	16.2	18.8
BEAR PAW SKI AREA	5200	2/28	23	7.0	3.8	6.8
BEAVER LAKE	5900	2/29	35	10.4	13.4	21.0
BERRY MEADOW	7000	2/28	18	4.8	6.2	7.2
BIG CREEK	6750	2/28	85	29.4	38.3	39.1
BIG SKY	7700	2/28	46	12.6	12.6	13.5
BIG SKY MEADOW	6350	2/28	36	9.6	7.8	9.0
BIG SNOWY	7150	2/29	59	19.2	12.5	18.2
BLACK BEAR	7950	2/27	89	30.0	39.7	35.3
BLACK BEAR PILLOW	7950	3/01	SP	25.8	33.2	31.6
BLACK MOUNTAIN	7750	3/02	46	12.4	11.2	12.3
BLACK PINE	7100	2/29	29	6.8	9.0	12.5
BLACK PINE PILLOW	7100	3/01	SP	8.0	8.6	12.5
BLOODY DICK	7600	2/28	36	9.2	10.5	12.1
BLOODY DICK PILLOW	7550	3/01	SP	5.4	9.7	10.7
BLUE LAKE	5900	2/29	38	11.9	17.0	23.7
BOTS SOTS	7750	2/27	30	5.9	5.8	6.6
BOULDER MOUNTAIN	7950	2/24	53	15.2	14.4	16.9
BOULDER MOUNTAIN PILLOW	7950	3/01	SP	16.3	16.8	18.2
BOX CANYON	6670	2/28	26	6.8	7.2	10.9
BOX CANYON PILLOW	6700	3/01	SP	6.2	5.3	8.1
BOXELDER CREEK	5100	2/28	26	7.2	5.6	7.9
BRANHAM LAKES	8850	3/02	79	25.6	25.2	25.7
BRIODER BOWL	7250	2/29	64	20.2	16.5	24.0
BRIDGER BOWL PILLOW	7250	2/29	SP	17.8	16.5	22.0
BRISTOW CREEK	3900	2/27	15	4.2	9.0	11.6
BRUSH CREEK TIMBER	5000	2/27	20	5.0	7.6	9.4
BULL MOUNTAIN	6600	2/28	18	4.1	5.8	5.2
CABIN CREEK	5200	2/27	1	0.1	3.2	6.8
CALL ROAD	8050	3/01	38	10.0	10.2	10.0
CALVERT CREEK	6430	2/27	30	6.6	9.6	10.5

SNOW March 1, 1984

DRAINAGE BASIN and/or SNOW COURSE	NAME	THIS YEAR			PAST RECORD	
		Elevation	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Last Year
FREO BURR PASS	8000	2/29	61	17.6	17.4	22.1
FREIGHT CREEK	6000	2/29	21	6.1	8.7	13.8
FRIDAY HILL	4620	2/27	42	10.8	22.4	22.9
FROHNER MEADOWS	6480	2/28	17	4.2	6.6	7.1
FROHNER MEADOWS PILLOW	6480	3/01	SP	5.3	6.2	6.7
GARVER CREEK	4250	2/27	21	5.0	10.3	10.7
GARVER CREEK PILLOW	4250	3/01	SP	4.5	9.6	9.5
GIBBONS PASS	7100	2/27	58	17.0	21.3	20.7
GOAT MOUNTAIN	7000	2/28	13	3.5	5.5	10.2
GOLO CREEK LAKE	7200	2/27	45	9.8	10.9	13.5
GOLO STONE	8100	2/28	45	12.0	12.9	15.1
GRASSHOPPER	7000	2/27	19	4.1	4.2	5.3
GRAVE CREEK	4300	2/27	32	8.9	18.2	16.7
GRAVE CREEK PILLOW	4300	3/01	SP	9.4	16.0	16.4
GRIFFIN CREEK DIVIDE	5150	3/01	22	5.0	8.2	11.1
GUNSLIGHT LAKE	6300	2/29	68	24.5	28.8	36.9
HAND CREEK	5030	2/27	30	6.8	9.6	12.7
HAND CREEK PILLOW	5030	3/01	SP	5.7	4.8	13.6
HAWKINS LAKE	6450	2/27	52	15.9	29.6	28.2
HAWKINS LAKE PILLOW	6450	3/01	SP	13.2	23.2	26.8
HEART LAKE TRAIL	4800	2/29	40	13.2	15.4	20.3
HEBGEN DAM	6550	2/29	39	10.8	13.0	11.3
HELL ROARING DIVIDE	5770	2/29	62	20.5	22.2	28.4
HERRIG JUNCTION	4850	2/27	53	14.4	22.6	24.4
HOL BROOK	4530	3/02	15	3.9	6.4	9.6
HOOOO MEADOW	6600	2/27	31	8.0	6.1	9.6
HOODOO BASIN	6050	2/29	89	33.2	40.4	44.6
HOODOO BASIN PILLOW	6050	3/01	SP	26.3	36.0	40.0
HOOOOO CREEK	5900	2/29	79	30.0	36.6	41.8
INDEPENDENCE	7850	2/28	39	11.1	10.8	16.8
INTERGAARD	6450	3/02	18	4.2	4.8	7.6
JAHNKE LAKE TRAIL	7200	2/28	31	6.6	8.4	8.9
JOHNSON PARK	6450	3/01	15	3.2	3.9	7.2
KEELER CREEK	3300	2/27	23	5.8	11.3	14.3
KINGS HILL	7500	3/01	36	9.0	7.7	12.2
KISHE NEHN	3890	2/28	16	3.3	6.0	8.3
KIWANIS CAMP	3720	2/28	9	2.2	0.0	2.1
KRAFT CREEK PILLOW	4750	3/01	SP	9.2	11.1	12.5
LAKE CREEK	6100	3/01	33	7.8	8.3	8.0
LAKEVIEW CANYON	6930	2/27	28	6.8	12.8	10.4
LAKEVIEW RIDGE	7400	2/27	28	7.0	12.8	9.3
LAKEVIEW RIDGE PILLOW	7400	3/01	SP	8.6	13.9	10.7
LEMHI PASS	7480	3/03	38	6.1	5.2	8.0
LEMHI RIDGE	8100	3/03	40	7.2	6.4	8.9
LEMHI RIDGE PILLOW	8100	3/01	SP	5.1	6.2	9.0
LICK CREEK	6860	2/27	36	8.7	6.4	8.8
LICK CREEK PILLOW	6860	3/01	SP	7.1	6.0	7.7
LITTLE PARK	7400	2/28	45	12.2	11.7	14.4
LOGAN CREEK	4300	2/27	14	3.3	4.4	7.4
LONE MOUNTAIN	8880	2/28	60	18.4	18.6	19.6
LOST HORSE	5940	2/28	68	21.8	24.0	29.5
LOST SOUL	4800	2/27	26	6.4	14.5	15.0
LOWER TWIN	7900					

SNOW March 1, 1984

DRAINAGE BASIN and/or SNOW COURSE NAME	Elevation	THIS YEAR			PAST RECORD	
		Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (Inches) Last Year	Average
SACAJAWEA	6550	2/29	40	11.5	11.8	13.1
SADDLE MOUNTAIN	7940	2/27	60	17.4	21.6	22.3
SADDLE MOUNTAIN PILLOW	7900	3/01	SP	17.8	21.3	22.6
SENTINEL CREEK	8300	2/28	57	16.8	21.2	21.0
SHOWER FALLS	8100	2/27	63	18.4	16.4	20.2
SHOWER FALLS PILLOW	8100	3/01	SP	18.3	16.4	19.1
SILVER RUN	6630	2/27	21	4.7	4.6	5.5
SILVER RUN PILLOW	6630	3/01	SP	4.6	3.8	4.2
SKALKHAO SUMMIT	7250	2/25	54	14.4	19.0	23.5
SKALKHAO SUMMIT PILLOW	7250	3/01	SP	12.6	17.9	23.5
SKYLARK TRAIL PILLOW	6200	3/01	SP	22.2	23.4	28.5
SLAG-A-MELT LAKE	8750	3/03	56	17.5	23.2	22.3
SLIDE ROCK MOUNTAIN	7100	3/01	40	10.4	10.4	14.6
SMUGGLER MINE	6960	3/02	38	9.0	10.2	8.9
SOUTH FORK SHIELDS	8100	2/29	70	22.0	17.4	21.2
SOUTH FORK SHIELDS PILLOW	8100	3/01	SP	14.4	11.7	13.6
SPOTTED BEAR MOUNTAIN	7000	2/29	29	8.4	11.4	14.2
SPUR PARK	8100	3/01	50	14.1	12.4	18.6
SPUR PARK PILLOW	8100	3/01	SP	14.4	14.1	19.1
STAHL PEAK	6030	2/27	78	25.7	34.0	35.9
STAHL PEAK PILLOW	6030	3/01	SP	21.6	31.2	30.0
STEMPLE PASS	6600	2/28	20	3.8	7.0	9.3
STORM LAKE	7780	2/28	35	8.8	11.2	11.3
STRYKER BASIN	6180	2/27	67	19.3	28.4	31.2
STUART MILL	6500	3/02	15	3.3	4.6	6.2
STUART MOUNTAIN	7400	2/28	70	24.0	27.8	28.6
SUCKER CREEK	3960	2/28	2	.4	.0	0.5
TAYLOR ROAD	4080	2/28	13	3.6	.0	3.4
TEN MILE LOWER	6600	2/28	21	5.1	6.4	6.7
TEN MILE MIDDLE	6800	2/27	30	6.2	7.8	10.0
TEN MILE UPPER	8000	2/27	36	8.0	8.8	12.3
TEPEE CREEK	8000	3/01	43	11.8	12.8	13.2
TEPEE CREEK PILLOW	8000	3/01	SP	10.6	11.5	10.7
TIMBERLINE CREEK	8850	2/27	42	9.2	12.2	12.3
TRAIL CREEK	7090	3/03	36	6.0	4.3	7.3
TRINKUS LAKE	6100	2/29	85	29.3	31.9	38.9
TRUMAN CREEK	4060	2/24	11	2.6	2.8	3.5
TV MOUNTAIN	6800	2/28	45	12.9	15.8	16.8
TWELVEMILE CREEK	5600	2/28	45	13.8	16.8	20.9
TWELVEMILE CREEK PILLOW	5600	3/01	SP	11.3	12.9	17.3
TWENTY-ONE MILE	7150	2/28	41	10.8	13.6	16.3
TWIN CREEKS	3580	2/29	17	5.7	9.8	11.7
TWIN LAKES	6510	2/28	83	27.2	29.6	37.7
TWIN LAKES PILLOW	6400	3/01	SP	24.8	30.2	36.9
UPPER HOLLAND LAKE	6200	2/28	70	23.2	23.6	32.7
WALDRON	5600	2/29	11	2.4	6.2	10.1
WALDRON PILLOW	5600	3/01	SP	4.3	7.1	9.6
WARM SPRINGS	7800	2/29	48	12.3	12.8	19.0
WARM SPRINGS PILLOW	7800	3/01	SP	13.6	14.2	19.2
WEASEL DIVIDE	5450	2/27	62	18.1	31.6	31.4
WEST ROSEBUD	7500	3/01	21	5.2	5.2	9.9
WEST YELLOWSTONE	6700	2/28	35	8.7	10.4	11.2
WEST YELLOWSTONE PILLOW	6700	2/28	SP	6.9	8.4	8.8
WHISKEY CREEK	6800	2/27	48	13.3	18.4	17.9
WHISKEY CREEK PILLOW	6800	3/01	SP	10.5	15.4	14.7

SNOW March 1, 1984

DRAINAGE BASIN and/or SNOW COURSE NAME	Elevation	THIS YEAR			PAST RECORD	
		Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (Inches) Last Year	Average
ALBERTA						
AKAMINA (AL)	5810	2/28	40	10.0	17.9	-
AKAMINA PILLOW (AL)	5810	3/01	SP	10.0		
ALLISON PASS (AL)	6490	2/28	38	9.3	13.8	-
BOW RIVER (AL)	5080	3/01	24	5.6	7.2	8.2
BOW RIVER SUMMIT (AL)	6660	2/29	45	11.2	11.6	13.1
CHATEAU LAWN (AL)	5710	3/01	27	6.7	9.5	10.5
CUTHEAD LAKE (AL)	7250	2/29	46	12.3	9.8	-
HIGHWOOD SUMMIT BUSH (AL)	7250	2/28	42	10.0	11.7	13.5
KATHERINE LAKE (AL)	7810	2/29	51	15.0	-	-
LARCH VALLEY (AL)	7740	2/29	50	13.6	-	-
LITTLE ELBOW SUMMIT (AL)	7090	2/28	33	7.4	10.3	9.6
LITTLE ELBOW SUMMIT PILLOW (AL)	7090	3/01	SP	8.9	-	-
MIRROR LAKE (AL)	6590	3/01	37	9.4	9.0	10.2
MOUNT SKOKI (AL)	6740	2/29	44	11.2	11.0	-
MUD LAKE (AL)	6200	2/28	32	6.4	10.1	-
PIPESTONE UPPER (AL)	5300	3/01	27	6.2	7.2	8.5
PTARMIGAN HUT (AL)	7150	2/29	48	12.7	11.5	13.5
SUNSHINE VILLAGE (AL)	7300	2/29	61	16.0		19.6
SUNSHINE VILLAGE PILLOW (AL)	7300	3/01	SP	17.4	15.3	-
THREE ISLE LAKE (AL)	7090	2/28	62	17.9	17.5	-
BRITISH COLUMBIA						
BEAVERFOOT (BC)	6200	2/28	20	4.2		8.3
FERNIE (BC)	3510	2/29	4	1.1	7.7	7.9
FERNIE EAST (BC)	4100	2/29	29	7.7	14.3	14.0
FERNIE NE (BC)	3510	2/29	13	3.6	9.6	9.1
FIDELITY MOUNTAIN (BC)	6130	2/28	107	35.1	31.6	42.6
FLOE LAKE (BC)	6860	2/28	66	20.7		26.4
GLACIER (BC)	4100	2/27	64	19.6	20.7	23.7
GRAY CREEK LOWER (BC)	5080	2/28	47	13.2	14.8	16.0
GRAY CREEK UPPER (BC)	6260	2/28	71	21.6	22.8	26.5
KICKING HORSE (BC)	5410	2/24	35	9.8	10.7	13.0
KIMBERLEY (BC)	3800	2/28	12	3.5	4.8	7.4
KIMBERLEY LOWER VOR (BC)	4490	2/29	17	4.7	6.8	8.0
KIMBERLEY MIDDLE VOR (BC)	5510	2/29	29	6.8	9.4	10.8
KIMBERLEY UPPER VOR (BC)	7020	2/29	41	10.7	13.7	17.1
MARBLE CANYON (BC)	4990	2/27	35	8.7	11.8	13.2
MORRISSEY RIDGE (BC)	6100	2/28	55	15.4	25.7	25.4
MOUNT ABBOT (BC)	6490	2/27	107	34.0	34.3	40.5
MOUNT ASSINIBOINE (BC)	7310	2/28	51	13.4		18.0
MOUNT JOFFRE (BC)	5740	2/28	32	6.7		13.0
MOYIE MOUNTAIN (BC)	6360	2/29	38	10.4	15.2	16.1
SINCLAIR PASS (BC)	4490	2/28	15	2.2	3.5	5.6
SULLIVAN MINE (BC)	5080	2/28	27	6.2	9.3	12.5
THUNDER CREEK (BC)	6590	2/28	27	5.4		9.6
UPPER ELK RIVER (BC)	4400	2/28	8	.6	2.8	6.8
VERMONT CREEK (BC)	4990	2/28	34	8.7		17.5

SP - Snow Pillow observations; water content only.

A - Aerial observation; water content estimated.

Columbia River Drainage

STREAMFLOW FORECASTS

BASIN STREAM AND FORECAST POINT	THIS YEAR				PAST RECORD				THIS YEAR				PAST RECORD				THIS YEAR				PAST RECORD					
	FORECAST		THOUSAND ACRE FEET		FORECAST		THOUSAND ACRE FEET		FORECAST		THOUSAND ACRE FEET		FORECAST		THOUSAND ACRE FEET		FORECAST		THOUSAND ACRE FEET		FORECAST		THOUSAND ACRE FEET			
	Thousands Acre Feet	Percent of Average	Last Year	Average	Thousands Acre Feet	Percent of Average	Last Year	Average	Thousands Acre Feet	Percent of Average	Last Year	Average	Thousands Acre Feet	Percent of Average	Last Year	Average	Thousands Acre Feet	Percent of Average	Last Year	Average	Thousands Acre Feet	Percent of Average	Last Year	Average		
PERIOD	April - September												April - July												April - June	
KOOTENAI RIVER below Libby Dam (1)	5,540	79	6,356	7,041	4,740	79	5,346	6,020																		
FISHER RIVER near Libby	165	62	264	150	150	60	248																			
YAAK RIVER near Troy	300	57	523	280	56	500																				
KOOTENAI RIVER at Leonia (1)	6,410	75	7,948	8,602	5,590	75	6,857	7,498	4,540	75	5,157	6,051														
INFLOW NOULTON RESERVOIR nr BUTTE (Million Gallons) . . .					184	70	182	263	165	70	179	237														
WARM SPRINGS CREEK AT MEYERS DAM near Anaconda (2) . . .	35.7	76	46.8	28.7	76	37.8																				
FLINT CREEK near Southern Cross (3)	13.2	72	18.9	18.3	11.0	71	15.2	15.4																		
FLINT CREEK below Boulder Creek (4)	55.3	73	75.8	42.8	72	59.5																				
INFLOW LOWER WILLOW CREEK RESERVOIR near Hall (5) . . .	9.4	60	11.6	15.7	8.8	59	10.2	14.9																		
MIDDLE FORK ROCK CREEK near Philipsburg	59.0	75	78.2	53.0	75	70.5																				
NEVADA CREEK near Finn	11.5	50	23.0	10.5	49	21.3																				
BLACKFOOT RIVER near Bonner	680	68	999	600	66	904	515	66																	782	
CLARK FORK RIVER above Missoula (6)	640	78	816	550	78	708	465	78																	597	
CLARK FORK RIVER above Missoula	1,320	73	1,362	1,815	1,150	71	1,133	1,612	980	71	880	1,379														
WEST FORK BITTERROOT RIVER near Conner (7)	118	66	178	105	64	164																				
BITTERROOT RIVER near Darby	395	68	580	350	66	532	305	66																	464	
SKALKAHO CREEK near Hamilton	44.8	80	56.0	38.0	78	48.7																				
BURNT FORK CREEK near Stevensville (8)	29.5	79	37.4	25.1	78	32.2																				
BITTERROOT RIVER at Missoula (9)	1,010	67	1,504	920	66	1,384	790	66																	1,191	
CLARK FORK RIVER below Missoula	2,330	70	3,319	2,070	69	2,996	1,770	69																	2,570	
CLARK FORK RIVER at St. Regis	3,200	73	3,450	4,411	2,890	73	3,073	3,928	2,500	73	2,437	3,428														
NORTH FORK FLATHEAD RIVER near Columbia Falls	1,435	75	1,913	1,280	74	1,732	1,090	74																	1,471	
MIDDLE FORK FLATHEAD RIVER near West Glacier	1,340	72	1,545	1,869	1,220	71	1,401	1,713	1,030	71	1,122	1,453														
SOUTH FORK FLATHEAD RIVER near Columbia Falls (10) . . .	1,670	73	1,847	2,278	1,550	72	1,715	2,142	1,360	72	1,416	1,886														
FLATHEAD RIVER at Columbia Falls (10)	4,550	73	4,943	6,208	4,200	73	4,508	5,721	3,600	73	3,654	4,921														
SWAN RIVER near Big Fork	535	78	689	470	78	604																				
FLATHEAD RIVER near Polson (11)	5,300	73	6,130	7,278	4,870	73	5,538	6,712	4,200	73	4,420	5,759														
CLARK FORK RIVER near Plains (11)	8,340	69	9,880	12,153	7,600	69	8,748	11,071	6,530	69	6,902	9,459														
THOMPSON RIVER near Thompson Falls	180	69	261	155	67	233																				
PROSPECT CREEK at Thompson Falls	100	70	142	92.5	70	132																				
CLARK FORK RIVER at Whitehorse Rapids (12)	9,250	68	13,575	8,420	68	12,351	7,185	68																	10,570	

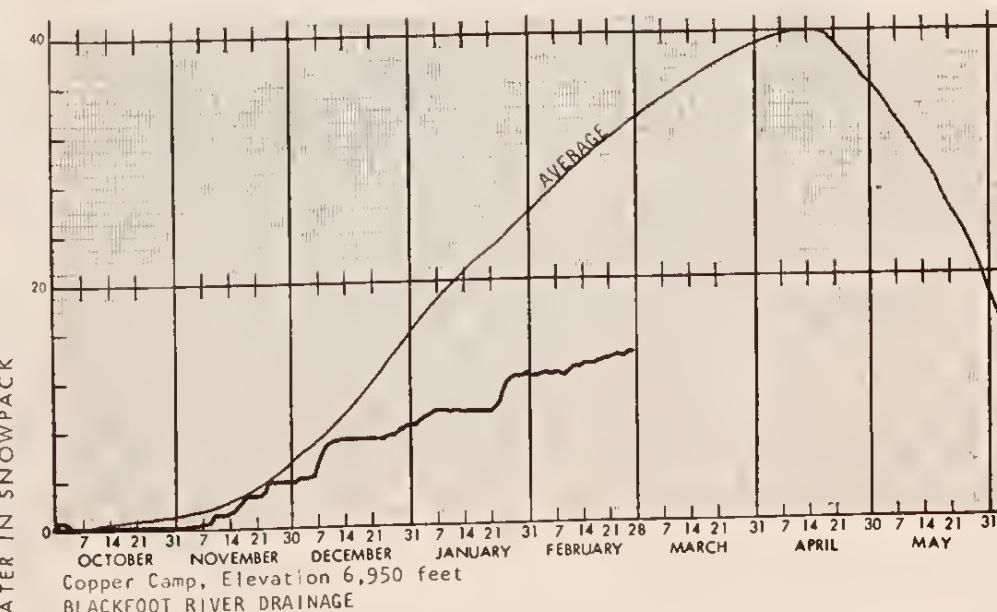
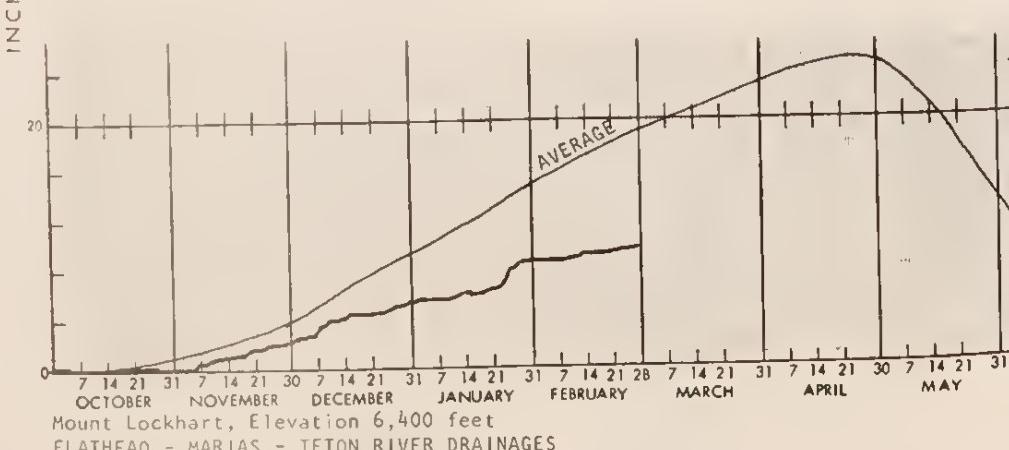
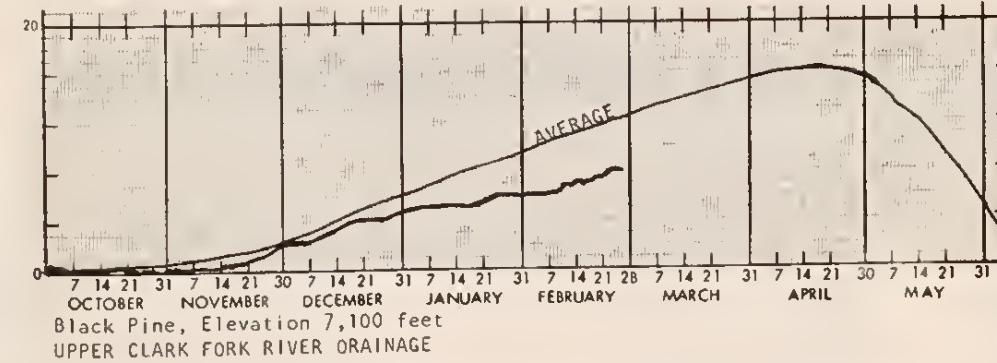
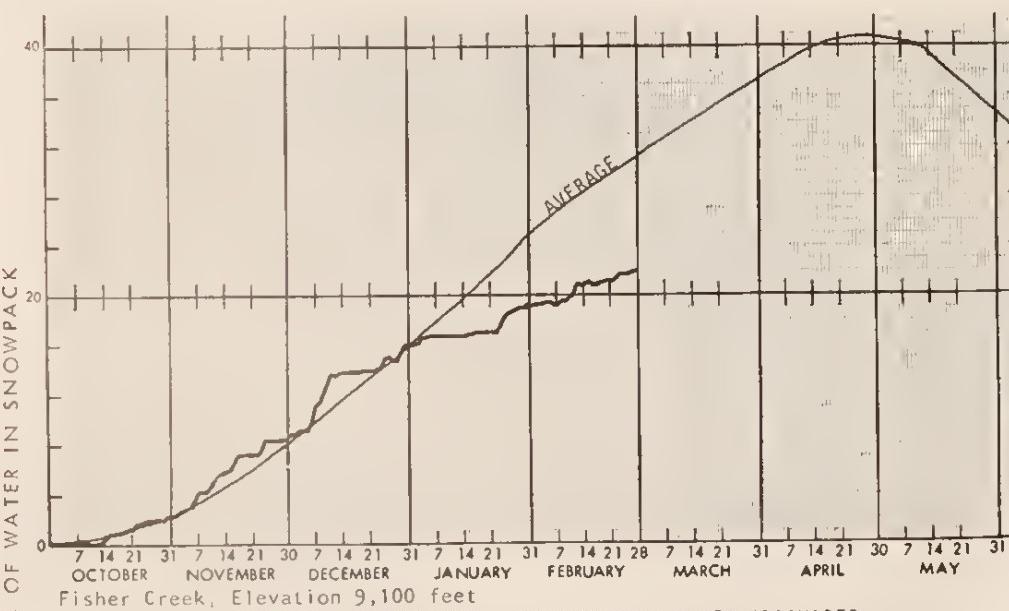
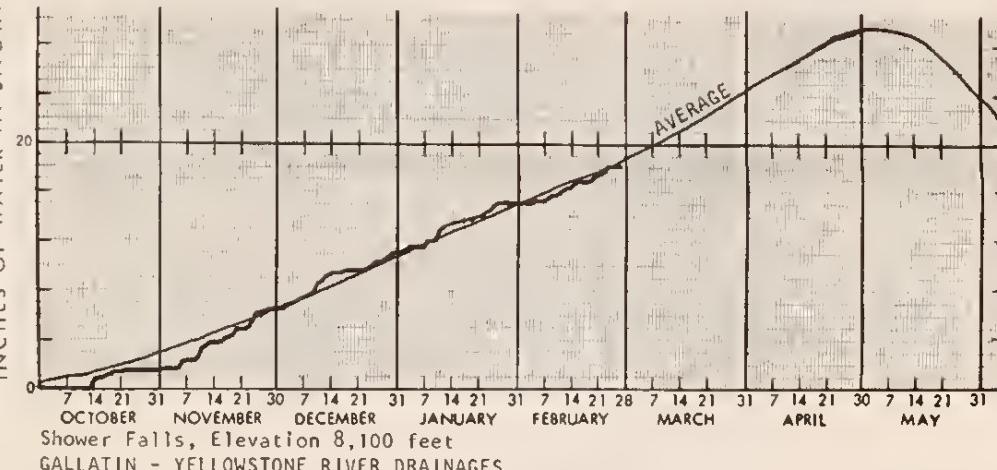
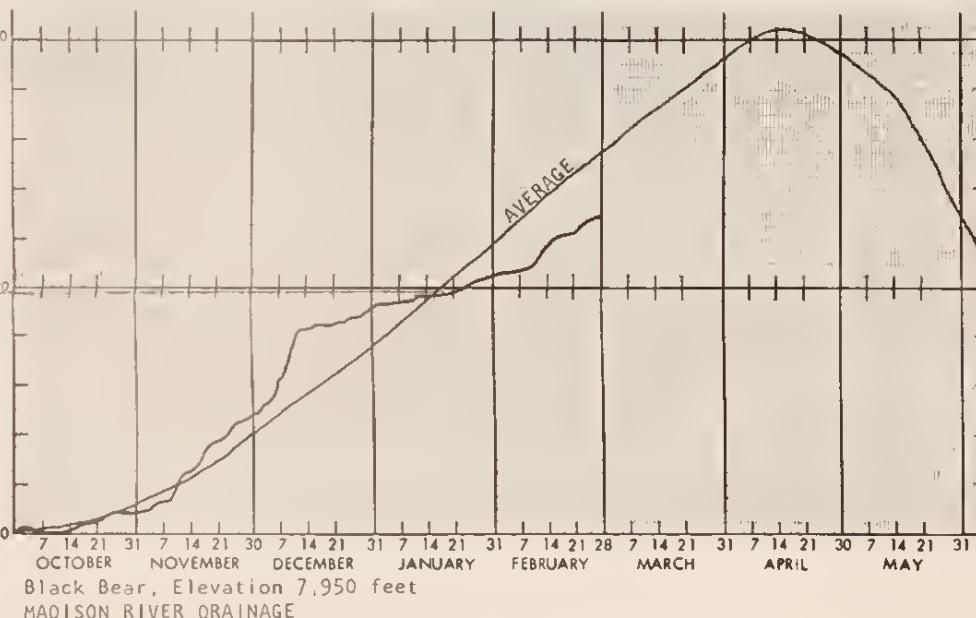
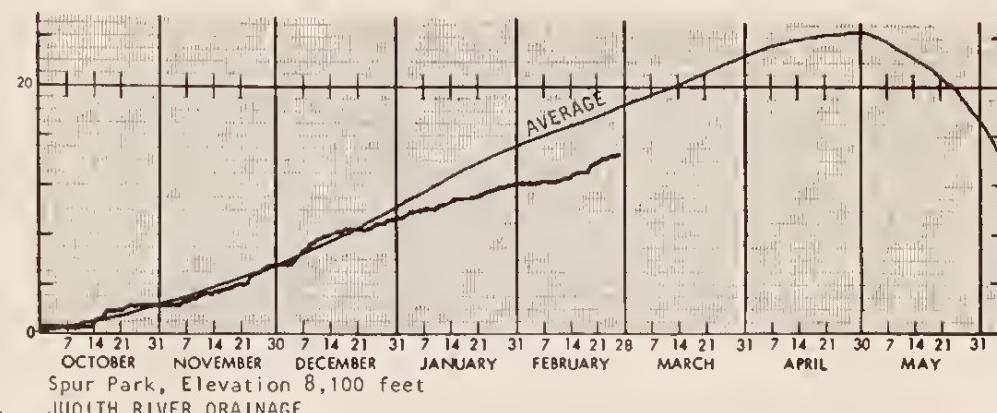
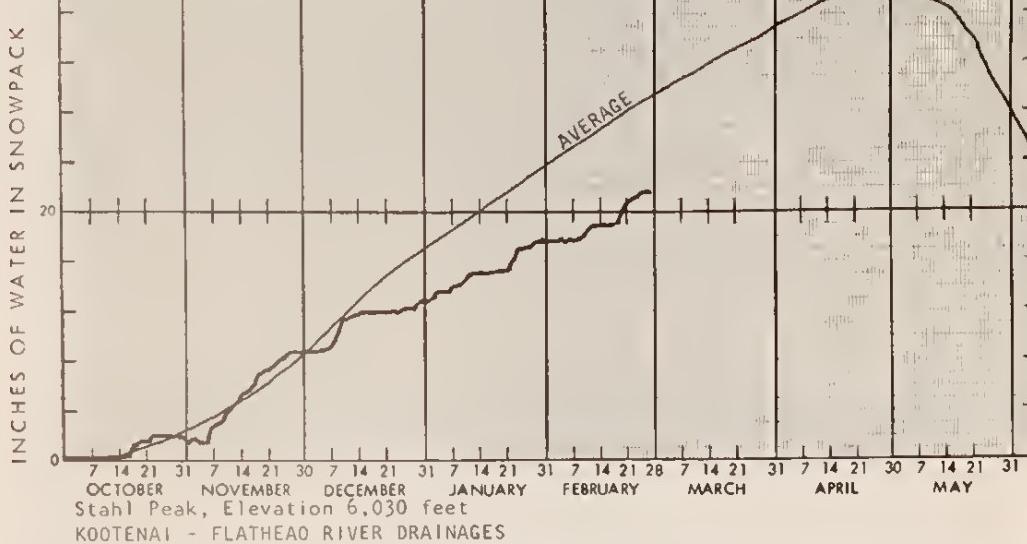
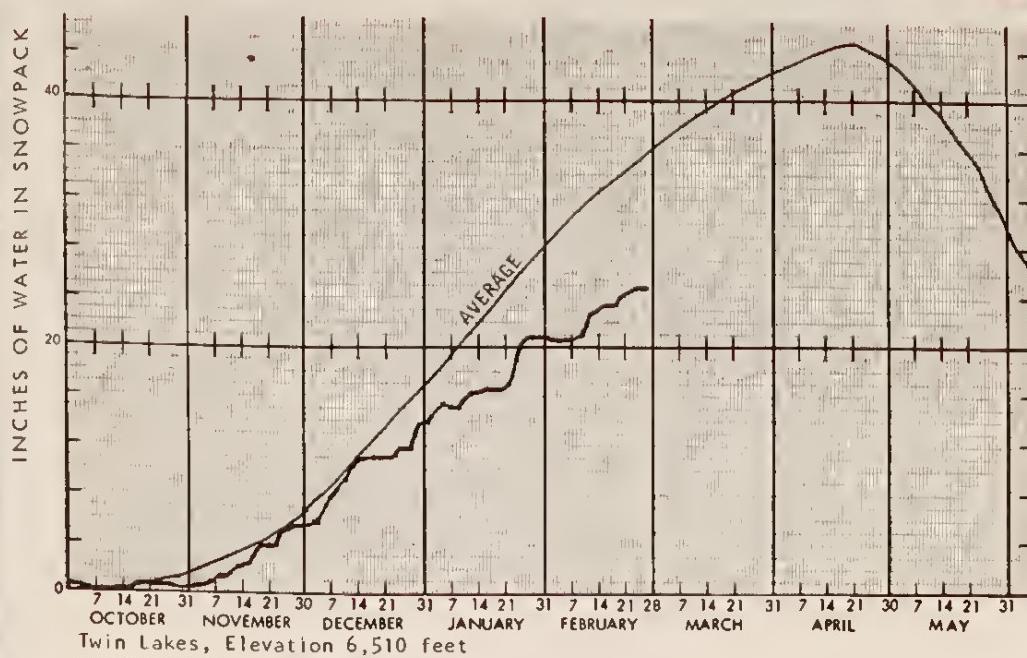
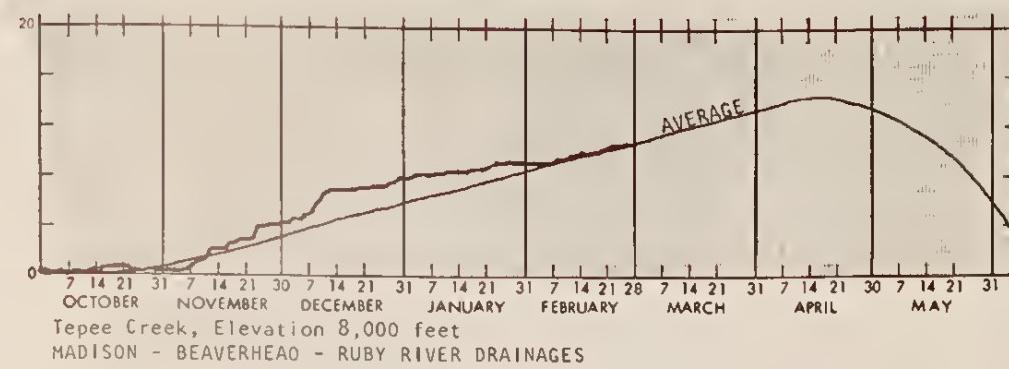
- (1) Adjusted for storage in Lake Koocanusa.
(2) Adjusted for storage in Silver Lake, diversions to and pumping from Georgetown Lake.
(3) Adjusted for storage in Georgetown Lake, diversions from and pumping to Silver Lake.
(4) Sum Flint Creek at Maxville and Boulder Creek at Maxville.
(5) Sum of North Fork Lower Willow Creek near Hall and South Fork Lower Willow Creek near Hall.
(6) Difference in observed flow Clark Fork above Missoula and Blackfoot near Bonner.

- (7) Adjusted for storage in Painted Rocks Reservoir.
(8) Adjusted for diversion into Sunset Highline Canal.
(9) Difference in observed flow Clark Fork above and below Missoula.
(10) Adjusted for storage in Hungry Horse Reservoir.
(11) Adjusted for storage in Hungry Horse Reservoir and Flathead Lake.
(12) Adjusted for storage in Hungry Horse Reservoir, Flathead Lake and Noxon Rapids Reservoir.

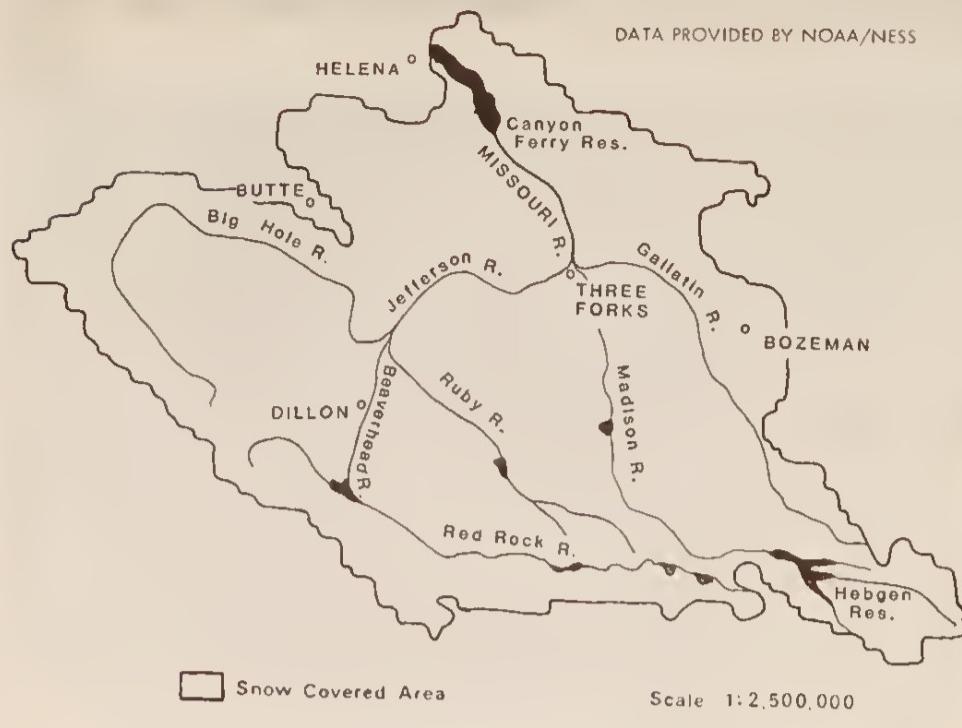
ALL FORECASTS PREPARED IN COOPERATION WITH THE NATIONAL WEATHER SERVICE

WATER SUPPLY OUTLOOK		
Expressed as "Poor, Fair, Average, Excellent" With Respect to Usual Supply		
STREAM or AREA	Flow Period	
	Spring Season	Late Season
Tobacco	Fair	Poor
Little Bitterroot	Fair	Poor
Mission Valley	Fair	Fair
Flint Creek	Fair	Fair

SNOW PILLOW DATA

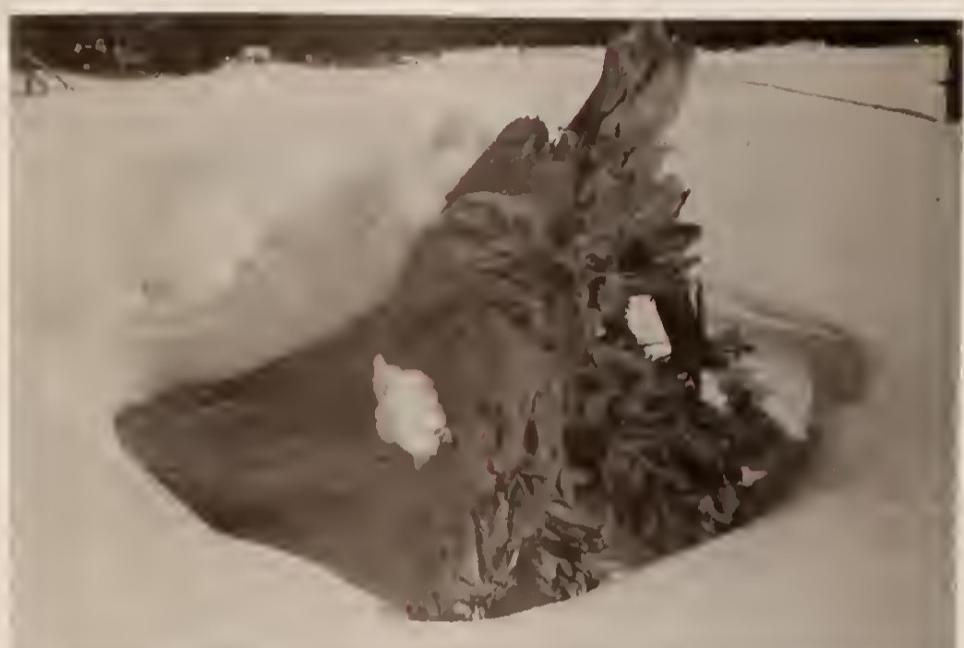


SATELLITE SNOW COVER



MISSOURI RIVER BASIN
Above
Canyon Ferry Dam

DATE	PERCENT SNOW COVER	AVERAGE SNOWLINE ELEVATION IN FEET
November 29, 1983	99.1	3940
December 20, 1983	100	3800
January 9, 1984	72	5720
January 31, 1984	78	5440
February 8, 1984	74	5630
February 27, 1984	100	3800



Shallow snowpacks expose many obstacles not normally seen by winter travelers.

RESERVOIR STORAGE (Thousand Acre Feet) END OF MONTH February 29, 1984

Basin or Stream	RESERVOIR	Usable Capacity	Usable Storage		
			This Year	Last Year	Average
COLUMBIA					
Kootenai	Koocanusa	5,748.2	2,789.0	2,190.0	---
Flathead	Hungry Horse	3,451.0	2,507.0	2,831.0	2,213.0
	Flathead Lake	1,791.0	787.4	752.8	934.1
	Camas (4)	45.2	29.5	31.2	12.3
Clark Fork	Mission Valley (8)	100.3	55.4	43.7	38.1
	Georgetown Lake	31.0	27.1	26.6	25.2
	Lower Willow Creek	4.9	3.3	1.6	1.6
	Nevada Creek	12.6	6.3	5.2	4.8
Bitterroot	Noxon Rapids	334.6	322.8	315.4	312.2
	Painted Rocks	31.7	---	---	16.1
	Como	34.9	23.9	---	12.6
MISSOURI					
Beaverhead	Lima	84.0	55.7	51.4	36.2
	Clark Canyon	257.2	171.8	165.0	141.2
Ruby	Ruby	38.8	27.8	27.6	26.7
Madison	Hebgen Lake	377.5	261.9	273.0	224.6
	Ennis Lake	41.0	31.2	30.7	35.7
Gallatin	Middle Creek	8.0	3.8	3.8	3.6
Missouri	Canyon Ferry	2,043.0	1,647.0	1,691.0	1,561.0
	Hauser & Helena	61.9	63.0	63.0	60.1
	Helena Valley	10.4	---	---	---
	Lake Helena	10.4	10.9	10.9	9.9
	Holter Lake	81.9	79.6	81.0	63.6
Smith	Fort Peck Lake	18,910.0	15,900.0	15,640.0	14,830.0
	Smith River	10.6	9.6	8.6	6.9
Musselshell	Newlan Creek	12.4	8.6	8.7	9.2
	Bair	7.0	3.2	5.2	4.7
	Martinsdale	23.1	14.2	18.3	9.5
Sun	Deadman's Basin	72.2	---	63.1	46.3
	Gibson	99.1	54.7	61.8	43.9
	Willow Creek	32.2	24.3	24.2	20.1
	Pishkun	32.0	19.4	19.9	17.8
Marias	Lower Two Medicine	11.9	---	---	7.0
	Four Horns	19.2	---	---	12.5
	Swift	30.0	13.1	14.9	15.2
	Lake Frances	111.9	47.2	85.1	70.1
Milk	Elwell (Tiber)	1,347.0	695.0	693.7	542.1
	Beaver Creek	3.5	3.1	3.1	1.7
	Fresno	127.2	24.6	13.2	58.5
	Nelson	66.8	39.1	44.4	38.7
HUDSON BAY					
St. Mary's	Lake Sherburne	64.3	35.2	35.8	21.9
YELLOWSTONE					
Stillwater	Mystic Lake	21.0	4.4	3.9	7.3
Clark's Fork	Cooney	27.4	17.0	17.6	14.6
Tongue	Tongue River	68.0	15.2	18.4	34.4
Bighorn	Bighorn Lake	1,356.0	839.0	962.6	590.4

AGENCIES AND ORGANIZATIONS COOPERATING IN MONTANA SNOW SURVEYS

GOVERNMENT AGENCIES

- Canada
 - Department of the Environment
 - Atmospheric Environment Service
 - Water Management Service
- British Columbia Ministry of Environment
 - Inventory and Engineering Branch, Hydrology Section
- Alberta Environment
 - Technical Services Division
- Federal
 - Department of the Army - Corps of Engineers
 - Department of Agriculture - Forest Service
 - Department of Commerce - National Environmental Satellite Service
 - Department of Interior - National Weather Service
 - Bureau of Indian Affairs
 - Fish and Wildlife Service
 - Geological Survey
 - National Park Service
 - Bureau of Reclamation
 - Bonneville Power Administration

STATE AGENCIES

- Montana Conservation Districts
- Montana Department of Fish, Wildlife and Parks
- Montana Department of Natural Resources and Conservation
- Montana State University - Agricultural Experiment Station
- University of Montana - School of Forestry

PRIVATE ORGANIZATIONS

- The Anaconda Company
- Big Sky of Montana
- Butte Water Company
- Flathead Valley Community College
- Montana Power Company
- Pondera County Canal & Reservoir Company

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.